

REVIEW OF THE APPLICATION OF INDONESIAN QUALIFICATION FRAMEWORK (IQF) IN SEVERAL STUDIES ON GROWTH-DEVELOPMENT OF CHILDREN

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Abstract

IQF (Indonesian Qualification Framework) is Kerangka Kualifikasi Nasional Indonesia (KKNI) which consist of 9 levels of competence. The 8th level of IQF is equivalent to the competence of Master degree as described in Master thesis, and the 9th level of IQF is equivalent to the competence of Doctor, as described in doctoral thesis. Usually, researchers having degree of Master and Doctor publish their scientific papers based on research in scientific journal.

The objective of this review is identify how far the result of several studies on growth and development of children published in Scientific Journal describe the competence of researchers in the application of the 8th and /or 9th levels of IQF.

According to IQF, those having the degree of Master and Doctor should have the following competence: 1) to develop the new knowledge through research producing innovative work for Master degree, and original or creative work for doctoral degree; 2) to solve the problem of science through inter or multi discipline approach for master degree and through inter, multi and trans discipline approach for doctoral degree.

Based on the competence, the researcher should conduct systematic study in term of continuation of thinking starting from title, objective, methods (type of design, population & sample and analysis), result, discussion on quality and accuracy of data, causal relationship, implication, conclusion of study followed by recommendation/suggestion. Discussion on the implication should show inter, multi and/or trans disciplinary approach to produce development of knowledge and innovative work for Master degree and creative & original work for doctor degree. Conclusion contains development of knowledge, while recommendation contains how to solve the finding problems. Based on the recommendation, the suggestion are formulated to contain innovative work for Master degree, and creative & original work for Doctor degree. To achieve the objective of this review, 11 studies on growth-development of children published in scientific journal concerning systematic studies as mentioned above were reviewed.

The results of review of several or all studies are as follows: 1) The type of design did not depend on the objective of study; 2) There was no statment of population; 3) Calculation of sample size was not based on type of design; 4) there was no discussion on quality and accuracy of data, causal relationship and implication of studies.

Based on this review, conclusion are as follows: IQF has not been applied fully, because of problem in research methods, which link with IQF. Hopefully, the readers are stimulated to attempt how they have competence according to the level 8 or 9 of IQF.

Keywords: Qualification, research method, implication of study.

1. INTRODUCTION

Indonesian Qualification Frame (IQF) is *Kerangka Kualifikasi Nasional Indonesia* (KKNI), which consists of 9 levels. The 8th level of IQF is equivalent to Master degree and the 9th level of IQF is equivalent to Doctor degree. Based on the 8th level of IQF, those having Master degree have 2 out of 3 following competence:

- They are able to develop knowledge, technology, and/or art in their scientific field or professional practice through research producing innovative and tested work
- They are able to solve the problem of science, technology, and/or art in their scientific field or professional practice through inter or multidiscipline approach.

Based on the 9th level of IQF, those having Doctor degree have 2 out of 3 competence as follows:

- They are able to develop the new knowledge, technology and/or art in their scientific field or professional practice through research producing creative, original and tested work
- They are able to solve the problem of science, technology, and/or art in their scientific field or professional practice through inter, multi and transdiscipline approach

Usually, those graduated as Master and Doctor work as College or University Lecturer, who have to develop their career in academic position starting from *assisten ahli* (expertise assistance), *lektor* (lecturer), *lektor kepala* (senior lecturer) and *professor* (the highest), for which they need to have credit point through publication of their scientific paper in Scientific Journal.

The objective of this literature review is to identify how far the results of several studies on growth and development of children published in Scientific Journal describe the competence of researchers in the application of the 8th level and the 9th level of IQF.

2. METHODS

The review of 11 studies concerning growth and development of children namely on improving growth (Lestari et al, 2012), working memory (Nugroho et al, 2010), growth velocity (Lyfia et al, 2009), cognitive outcome (Setyorini et al, 2010), development delay (Iskandar A 2010), language and visual motor (Samsudin, 2009), obesity (Laila, 2012), cognitive intelligence (Montolalu et al, 2009), academic achievement (Pardede et al, 2009), and language development (Yuridyah et al, 2009) and language development (Rano, 2009).

The review of each study is in the application of systematic research conducted in term of continuation of thinking starting from title, objective, methods, result, discussion, and conclusion of study followed by recommendation and/or suggestion; it means there is continuation or relationship of several aspects between the title and the following chapters (Lapau, 2013). The section of method consists of type of study design, population and sample, data collection and data analysis. The type of study design is formulated based on study objective.

Population and sample consist of calculation of sample size and the procedure of taking representative sample from the population; it means that the result of sample can be generalized to the population. Calculation of sample size is based on the type of study design formulated (WHO, 1986). If the sample size is less than what should be, the α error and β error become higher, that decrease the validity of the result of study. The collection of data is excluded in this review, because it is more substantial than methodical. But the method of data analysis, which consist of univariate, bivariate and multivariate analysis is included in this review. The result of study is actually the result of analysis; the result of bivariate analysis is not conclusive, while the result of multivariate analysis is more conclusive after discussion of causal relationship.

The section of discussion is concerned with quality and accuracy of data, causal relationship, and implication of study (Lapau, 2013). Quality of data consist of relevancy and validity of data, while accuracy of data consists of relevance, validity and reliability of data (Lapau, 2012). Relevance of data means that whether collected and analyzed data are full enough and relevant to achieve the study objective and prove hypothesis. Validity of data consists of internal and external validity. Internal validity opposite of systematic error and random error. Systematic error consists of selection, information and confounding bias, while random error consists of α error and β error.

The result of multivariate analysis may identify the true independent variable or exposure which is associated with the dependent variable, and confounding variable which makes confounding bias. Causal relationship between the exposure and the dependent variable is based on Hill criteria (Beaglehole et al, 1993), if the types of design used by researcher are *case control study* and *cross sectional study*. Types of study design which directly produce causal relationship are observational study namely *prospective and retrospective cohort studies* and intervention study namely *before and after with control study, randomized clinical trial and randomized community trial*.

Implication of study is to use the result of causal relationship for recommendation; it means that the researcher recommend to intervene the causal factor. Then based on the recommendation, the suggestion is formulated through *interdiscipline* approach producing *scientific knowledge development* and *innovative work* (Lapau, 2013). This is what expected by IQF. Thus section of conclusion and recommendation/suggestion has to be based on the section of discussion especially the subsection of implication of study.

3. RESULTS

Table 1 shows that 1) The types of design of study number 1, 2 and 3 are based on the objective of study, but the type of design of study number 4, 5 and 6 are not based on the objective of study; for example for study number 6, the objective of study should be as follows: to examine exclusive breast feeding as the cause of language and visual motor development; 2) For the study from number 1 to number 6, there were no statement about population, calculation of sample size and the procedure of taking sample from the population, except for the research number 5, there is statement on calculation of sample size for which α error= 5% and power= 80%.

Table 1. The title of study by objective and methods (type of design, population and sampling)

No	Title of study	Objective of study	Methods	
			Type of design	Population and sampling
1	Reduced serum zinc levels while improving growth of underweight school children in trial of zinc fortified milk	To evaluate the effect of milk fortification with zinc on serum zinc levels in underweight Indonesian school children	Randomized double blind community trial	No statement of population, calculation of size of sample, and procedure of sample
2	Effect of iron and zinc on working memory of underweight poor urban school children	To determine the effect of milk fortified with iron and zinc in memory of underweight urban school children	Randomized blind controlled trial	The same as number 1
3	Growth velocity in elementary school children iron deficiency anemia after iron therapy	To study the effect of iron therapy on growth velocity in children with iron deficiency anemia	Randomized clinical trial study	The same as number 1
4	Cognitive outcome in late preterm baby measured by Mullen scale in three months age	To compare cognitive outcome between late preterm and full term babies at three months age	Cohort study	The same as number 1
5	Correlation between hyper bilirubin anemia and development delay in 2 – 4 years old children	To investigate relationship between in term infants and development delay in 2 – 4 years old children	Retrospective cohort study	Sample size was estimated by using α error 5%, power 80%, and predicted correlation 0,35 No statement about population and no sampling procedure
6	Comparison of language and visual motor development between exclusively breastfed infants through cognitive adaptive test/ clinical linguistic, and auditory milestone scale	To compare the language and visual motor development between exclusively breastfed and non exclusively breastfed infants	Historical cohort study	No statement of population, calculation of size of sample and sampling procedure

Table 2 shows that 1) The type of design of study number 7 is not based on the objective of study, because the objective indicate causal relationship, while *case control study* cannot produce causal relationship directly; each type of design of study number 8 to 11 is based its own objective; 2) In each study number 7 to 11, there was no statement of population, calculation of sample size, and the procedure of taking sample from the population.

Table 2. The Title of study by objective and methods (type of design, population and sampling)

No	The Title of study	Objective	Methods	
			Type of design	Population and sampling
7	Breastfeeding and decreased for childhood obesity	To determine influence of infant breastfeeding practice on risk of obesity in children aged 6 to 8 years	Case control study	No statement of population, no calculation of size of sample and sampling procedure
8	Relationship between obesity and cognitive intelligence in junior high school students	To determine the relationship between obesity and cognitive intelligence in junior high school students	Cross sectional study	The same as number 7
9	Academic achievement of children with pre anemic iron deficiency	To investigate the prevalence of pre anemic iron deficiency in school aged children and to determine whether this condition is at risk factor for low academic achievement	Cross sectional study	The same as number 7
10	Quality of home stimulation and language development in children aged 12 – 24 months living in orphanage and family home	To determine quality of home stimulation and language development and their correlation in children living in orphanage and family home	Cross sectional study	The same as number 7
11	Measuring language development in PDD and non PDD (pervasive development disorders)	To explore differences in receptive language, verbal expressive and non verbal expressive language between PDD and non PDD	Cross sectional study	The same as number 7

Table 3 shows that 1) In each study number 1, 4 and 5, there was bivariate and multivariate analysis, but in each study number 2, 3 and 6, there was only bivariate analysis; 2) In each study from number 1 to number 6, there was no discussion on quality and accuracy of data, causal relationship, and implication; 3) there is link between conclusion and the type of study design in the study number 2 and 4, but no link between conclusion and the type of study design in the study number 1, 3, 5 and 6.

Table 3. The title of study by methods (analysis), discussion, and conclusion

No	Title of study	Methods		
		Analysis	Discussion	Conclusion
1	Reduced serum zinc levels while improving growth of underweight school children in trial of zinc fortified milk in Indonesia	Bivariate analysis using significance test: t tes and Xsquare test Multivariate analysis: multiple logistic regression	No discussion on quality and accuracy of data, causal relationship and implication	Reduced mean serum zinc levels were observed in children who received standard milk, as well as who received zinc fortified milk
2	Effect of iron and zinc fortified milk supplementation on working memory of underweight poor urban	Bivariate analysis: using significance test namely X square and t test	The same as number 1	Milk fortified with iron and zinc improve working memory
3	Growth velocity in elementary school children with iron deficiency anemia after iron therapy	Bivariate analysis: t test and Mann Whitney test	The same as number 1	There is significance difference in height but no significance difference between both group in growth velocity
4	Cognitive outcome in late preterm baby measured by orellem scale in three months connected age	Bivariate analysis: t test, Mann Whitney test and X square test Multivariate analysis: multiple logistic regression	The same as number 1	Cognitive outcome of late preterm babies was delayed compared to full term babies
5	Correlation between hyper bilirubin anemia in term Infants and development delay in 2 – 4 year old children	Bivariate analysis: to calculate relative risk Multivariate analysis: multiple logistic regression	The same as number 1	There is relationship between hyperbilirubinemia in tern infants and development delay in 2-4 year old children
6	Comparison of language and visual motor between exclusively and non exclusively breastfeed infants through cognitive adaptive test, clinical linguistic, and antibody milestone scale	Bivariate analysis: X square test, t test and Mann Whitney test	The same as number 1	Exclusive breastfed infants has higher language and visual motor developmental quotient score than non exclusively breastfed infants

Table 4 shows that 1) In each study from number 7 to 11, there is only bivariate analysis; 2) In each study from number 7 to 11, there is no discussion on quality and accuracy of data, causal relationship and implication; 3) There is link between conclusion and study objective in research from number 8 to number 11, but in study number 7 the type of study design is not relevant.

Table 4. The Title of study by method (analysis), discussion, and conclusion

No	Title of study	Method		
		Analysis	Discussion	Conclusion
7	Breastfeeding and decreased for childhood obesity	Bivariate analysis: X square test	No discussion on quality and accuracy data, causal relationship and implication	Exclusive infant breast feeding and longer duration breast feeding lowered the risk for childhood obesity in children aged 6-8 years
8	Relationship between obesity and cognitive intelligence in junior high school students	Bivariate analysis: Somer's test	The same as number 7	Obesity has relationship with cognitive intelligence in junior high school students
9	Academic achievement of children with pre anemic iron deficiency	Bivariate analysis: X square test and Fisher's exact test	The same as number 7	This study able to determine whether pre-nemic iron deficiency is the risk factor for academic achievement
10	Quality of home stimulation and language development in children aged 12 – 24 months living in orphanage and family home	Bivariate analysis: X square test, Fischer exact test, Mann Whitney test, Pearson's product moment test	The same as number 7	The quality of home stimulation in orphanages, which result in a higher rate of language delay in children aged 12-24 months
11	Measuring language development in pervasive development disorders (PDD) and non PDD children	Bivariate analysis: X square test and t test	The same as number 7	PDD children are more likely to have a delay in receptive language compare to non PDD children

4. DISCUSSION

4.1. Intervention Study Producing Causal Relationship

Intervention studies which were used in study number 1, 2 and 3 produce causal relationship. Since there was no discussion on quality and accuracy of data, we do not know the level of α and β errors and how far the result of study from the sample to be generalized to certain population. Since there was no discussion on implication of study, the researchers did not make correct conclusion, recommendation and suggestion. For example research number 2, the researcher concluded that *milk fortified with iron and zinc improves working memory of underweight poor urban*. This conclusion should be followed by recommendation namely 1) similar study has to be continued in the larger population from which a sample representative is taken with certain α error and β error; 2) based on the continued study, recommendation is formulated to be a policy whether milk fortified iron and zinc is used to improve working memory for underweight children. Based on the recommendation, the researcher formulate several suggestions by conducting interdiscipline approach using the discipline of nutrition, pediatricis, economist to formulate suggestions of innovative work, as it is expected according to the IQF.

4.2. Observational Study Producing Causal Relationship

Obsevatonal studies which were used in study number 4, 5 and 6 produce causal relationship. Since there

were no discussion on quality and accuracy of data, except for the research number 5, we do not know the level of α error and β error, and how far the result of study can be generalized to certain population. Since there was no discussion on implication of study, the researchers did not make correct conclusion, recommendation and suggestion. For example study number 5, the researcher conclude that *there is relationship between hyperbilirubinemia in term of infants and development delay in 2-4 year children*. Because this study used retrospective cohort study, the conclusion should be as follows: *hyperbilirubinemia in term infants influence the development delay of 2-4 year children*. This conclusion should be followed by recommendation namely 1) similar study has to be continued in the larger population from which a representative sample is taken; 2) if based on the continued study, the hypothesis is proved that hyperbilirubinemia cause development delay in 2-4 year children, the recommendation should be formulated as follows: *hyperbilirubinemia in infants has to be prevented before and after they were born*. Based on the recommendation, the researcher conducts interdiscipline approach using the disciplines of pediatrics, obstetric-gynaecology, clinical pathologist, etc. to formulate several suggestions of innovative work, as it is expected according to the IQF.

4.3. Case Control and Cross Sectional Studies do not Produce Causal Relationship:

Observational studies which was used in study from number 7 to number 11 do not produce causal relationship. Since there are no discussion on quality and accuracy of data, we do not know the level of α error and β errors, and how far the result of study can be generalized to certain population. Since there was no discussion on causal relationship using Hill criteria especially for the case control and cross sectional studies, we do not know what independent variables influence each dependent variable in each study from number 7 to number 11. As a result, the conclusion of study can be made only as follows: *Non-exclusive breast feeding is the risk factor of obesity in children aged 6-8 years*, for study number 7; *obesity is the risk factor of cognitive intelligence in junior high school student* for study number 8; *there is no association between preanemic iron deficiency and low academic achievement* in study number 9 may be because of small sample size, *home stimulation is the risk factor of language delay in children aged 12-24 months* for study number 10, and *PDD is the risk factor for language development*, for the study number 11.

5. CONCLUSION

Based on the review of the 11 articles presented in Scientific Journal, IQF has not been applied because of some problems in research methods and IQF itself has not been socialized among researchers. We hope the readers especially publishers and researchers who had opportunity to read this literature review, may be stimulated how they contribute in the development of science in their field through research and interdiscipline and multidiscipline approach in producing innovative and tested work, as stated in the IQF.

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